SCIENTIFIC PAPER

A Ten-Year Experience With Laparoscopic Treatment of Splenic Cysts

Edward H. Chin, MD, Ron Shapiro, MD, David Hazzan, MD, L. Brian Katz, MD, Barry Salky, MD

ABSTRACT

Background and Objectives: The management of symptomatic splenic cysts lacks clear, evidence-based guidelines due to its low incidence. Recently, laparoscopic treatment has been described. We present our experience with the laparoscopic management of solitary splenic cysts with a review of the existing literature, and recommendations for therapy.

Methods: All patients who underwent laparoscopic treatment of splenic cysts over a 10-year period were identified. The medical records of these 9 patients were reviewed.

Results: All surgeries were performed laparoscopically, with no conversions. Two patients underwent cyst decapsulation, and 7 patients underwent cyst unroofing. No major complications occurred. Recurrence occurred in 33.3% of patients; unroofing had a recurrence rate of 42.9% compared with 0% after decapsulation. Pseudocysts were found in 66.7% of patients and true cysts on final pathology were found in 33.3%.

Conclusions: Laparoscopic decapsulation and unroofing of splenic cysts are safe procedures that confer the advantages of both splenic preservation and minimally invasive surgery. Cyst unroofing has a high recurrence and should be selectively used. Laparoscopic cyst decapsulation is associated with longer operative time, but should be considered as first-line therapy.

Key Words: Splenic Cyst, Pseudocyst, Laparoscopy, Unroofing, Decapsulation, Splenectomy.

INTRODUCTION

Splenic cysts are classified as true cysts or pseudocysts based on the presence of an epithelial lining. True cysts can be further subdivided into those with parasitic and nonparasitic causes. Nonparasitic, true cysts are congenital, present at a young age (7 to 32 years), and are typically located in the upper pole of the spleen.[1] Pseudocysts are believed to develop from posttraumatic splenic hematomas, and account for 75% of all nonparasitic splenic cysts.[2] Although nonparasitic splenic cysts are rare, the incidence appears to be rising, likely due to the frequent use of abdominal imaging and the increasingly successful nonoperative management of splenic injuries.[3]

Cysts >5cm are susceptible to hemorrhage, rupture, and infection and should be managed surgically, even when asymptomatic.[4] There is a lack of experience with this condition, with no evidence-based treatment guidelines.

Laparoscopic splenectomy has now become the standard approach for many conditions, including huge cysts of the spleen.[5,6] Splenectomy carries the risk of overwhelming postoperative infection and thrombocytosis, however.[7] Spleen-preserving alternatives to the treatment of splenic cysts have been proposed, which include aspiration, unroofing, decapsulation, and partial splenectomy.[8] Reports of these procedures are predominantly single case reports, frequently in pediatric patients. We describe a 10-year experience with laparoscopic, spleen-preserving treatment of splenic cysts in 9 patients, which represents the largest series to date.

METHODS

Between 1996 and 2006, all patients with splenic cysts who underwent laparoscopic surgery at the Mount Sinai Medical Center were identified by an ICD-9 search. Full approval from the Institutional Review Board was obtained. Only patients with confirmation of splenic cysts by pathology were included. Demographic data, diagnosis, operative procedure, complications, and pathology results were obtained from office and hospital records. Unroofing involved opening the cyst, complete evacuation of fluid, and partial excision of the cyst wall, with or without filling the cyst cavity with omentum. Decapsulation was defined

Department of Surgery, Mount Sinai School of Medicine, New York, New York, USA (Drs Chin, Shapiro, Katz, Salky).

Department of Surgery, Carmel Medical Center, Haifa, Israel (Dr Hazzan).

Address reprints requests to: Edward H. Chin, MD, One Gustave L. Levy Place, Box 1259 New York, NY 10029, USA. Telephone: 212 241 2115, Fax: 212 410 0111, E-mail: edward.chin@mountsinai.org

as complete excision of the cyst capsule, with or without a rim of splenic parenchyma.

RESULTS

Over a 10-year period, 9 patients with splenic cysts underwent laparoscopic treatment at our institution. Demographic data are presented in **Table 1**. Only one patient had a history of abdominal trauma, and one patient had a large, asymptomatic cyst.

Laparoscopic unroofing of the cyst was undertaken in 77.8% (n=7) of patients, and cyst decapsulation in 22.2% (n=2). Mean operative time and blood loss are presented in **Table 1**. For cyst unroofing, mean operative time was 88 minutes compared with 203 minutes for decapsulation (P=0.01). Mean blood loss was not significantly different between the 2 procedures (27 mL and 63 mL; P=0.9).

The postoperative complication rate was 33.3% (n=3); all complications were minor, and consisted of urinary retention (n=2) and ileus (n=1). No major complications or deaths occurred. Mean length of stay was 1.4 days (range, 1 to 3; SD, 0.9).

Overall recurrence rate was 33.3% (n=3). Patients treated with cyst unroofing (42.9%, n=3) had recurrence, while no recurrences were seen after decapsulation (p=NS). Two patients with recurrence underwent subsequent laparoscopic splenectomy with complete resolution of symptoms. In one of these patients, an attempt at partial splenectomy was aborted intraoperatively after significant splenic devascularization occurred. One recurrent cyst was located in the upper pole of the spleen, and at reoperation was noted to be resealed by the diaphragm. One recurrence was detected on routine imaging and did not require further intervention.

Table 1.
Demographics, Surgery and Pathology Details

Age (mean years [range])	36 (22–60)
Female	5 (55.6%)
Male	4 (44.4%)
Presentation	
Abdominal pain	3 (33.3%)
Left shoulder pain	2 (22.2%)
Palpable mass	2 (22.2%)
Early satiety	1 (11.1%)
Incidental finding	1 (11.1%)
Cyst size (cm [range])	14.6 (6–25)
Operative time (min [range])	113.6 (45–28)
Blood loss (mL [range])	35.0 (20–100)
Pathology	
True cyst (n=4)	44.4%
Pseudocyst (n=5)	55.6%

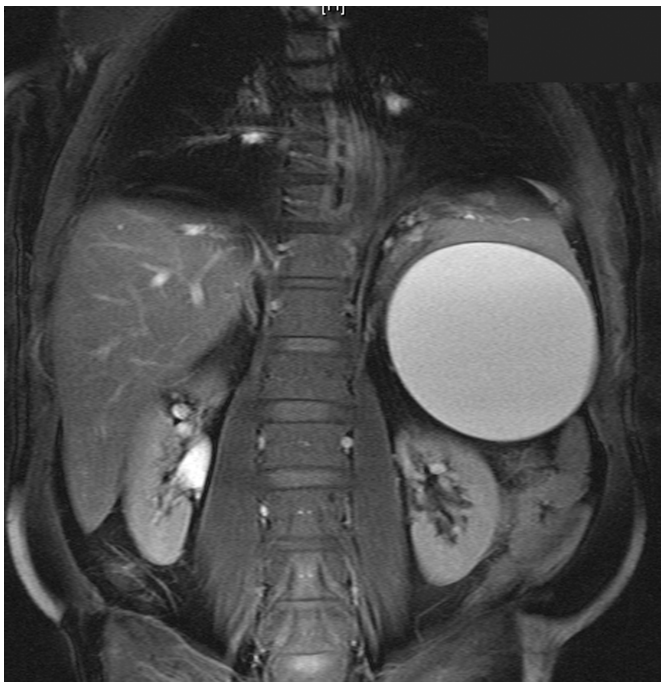

Figure 1. A contrast magnetic resonance image in the coronal plane demonstrates a 10-cm cyst of the spleen.

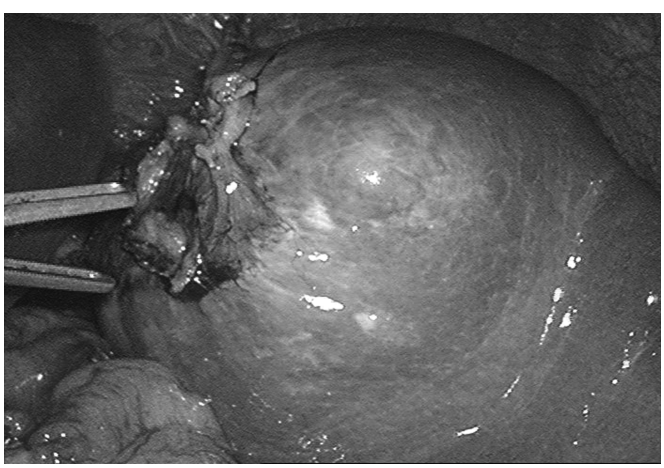

Figure 2. Operative picture of a recurrent splenic cyst after simple unroofing.

On pathological examination, either true, epithelial-lined cysts or pseudocysts were found **(Table 1)**. The initial pathologic diagnosis was incorrect in 2 patients who underwent deroofing; after subsequent splenectomy, pathology revealed epithelialized cysts. True cysts recurred in 50% of patients after surgery, compared with 20% of pseudocysts (P=0.9).

DISCUSSION

The optimal surgical treatment of splenic cysts is unclear. While laparoscopic splenectomy has significantly less morbidity than open splenectomy, it renders the patient asplenic, with the potential for immunosusceptibility and thrombocytosis.[9] Percutaneous cyst aspiration is associated with high recurrence rates[10] and a risk of abscess formation,[11] and should be reserved for poor surgical candidates. Laparoscopic spleen-preserving procedures have the advantages of both minimally invasive and spleen-preserving surgery.

A definitive algorithm for the laparoscopic treatment of splenic cysts is difficult to create, because of the rarity of this condition. Our institution is a large, tertiary-care hospital with a strong background in laparoscopy, which includes the initial report of laparoscopic unroofing of a splenic cyst in 1985.[12] Despite a high volume of laparoscopic surgery performed each year, only 9 cases of laparoscopic splenic cyst treatment were accrued over the past decade.

Laparoscopic unroofing of splenic cysts has been performed by multiple institutions with a recurrence rate of approximately 25%. The most effective published technique has been laparoscopic cyst decapsulation, with excellent results in small series.[13,14] Partial splenectomy is technically challenging but can also be performed with low morbidity,[8] and is recommended for deeply located cysts.[15] We unsuccessfully attempted partial splenectomy in one patient; while performing vascular isolation, a significant portion of the spleen became ischemic and required total splenectomy.

In our series, laparoscopic cyst unroofing had significantly shorter operative time than did laparoscopic decapsulation but had a higher recurrence rate (43% vs. 0%) that did not reach statistical significance. Previous studies report higher recurrence rates for epithelialized cysts than for pseudocysts[16]; we noted a similar trend in our series. Failure after cyst unroofing has also been attributed to early sealing by adjacent structures; we confirmed this mechanism at reexploration of a patient whose upper pole cyst had become sealed by the diaphragm and reaccumulated shortly after unroofing.

CONCLUSION

Laparoscopic cyst decapsulation was both safe and extremely effective in our limited series and should be considered as initial treatment for large symptomatic splenic cysts. Simple cyst unroofing should be reserved for splenic cysts located away from adjacent organs or when a pseudocyst is suspected, ie, after trauma and in patients presenting at an advanced age.

References:

1. Dachman AH, Ros PR, Murari PJ, et al. Non-parasitic splenic cysts: a report of 52 cases with radiologic-pathologic correlation. *Am J Radiol*. 1986;187:537–542.

2. Andrews MW. Ultrasound of the spleen. *World J Surg*. 2000; 24:183–187.

3. Pachter HL, Hofstetter SR, Elkowitz A, et al. Traumatic cysts of the spleen – The role of cystectomy and splenic preservation: Experience with seven consecutive patients. *J Trauma*. 1993;35: 430–436.

4. Walz MK, Metz KA, Sastry M, et al. Benign mesothelial splenic cyst may cause high serum concentration of CA 19–9. *Eur J Surg*. 1994;160:389–391.

5. Rosin D, Brasesco O, Rosenthal RJ. Laparoscopic splenectomy: New techniques and indications. *Chirurg*. 2001;72:368–377.

6. Yagi S, Isaji S, Iida T, et al. Laparoscopic splenectomy for a huge splenic cyst without preoperative drainage: report of a case. *Surg Laparosc Endosc Percutan Tech*. 2003;13:397–400.

7. Shaw JHF, Print CG. Postsplenectomy sepsis. *Br J Surg*. 1989;76:1074–1081.

8. Balzan SM, Riedner CE, Santos LM, et al. Posttraumatic splenic cysts and partial splenectomy: report of a case. *Surg Today*. 2001;31:262–265.

9. Curran TJ, Foley MI, Swanstrom LL, et al. Laparoscopy improves outcome for pediatric splenectomy, *J Pediatr Surg*. 1998; 33:1498–1500.

10. Mahomed AA, Merry C, Guiney EJ. Splenic cysts—aspiration or partial splenic decapsulation. *South African J Surg*. 1998;36: 84–86.

11. Moir C, Guttman F, Jequier S, et al. Splenic cysts: aspiration, sclerosis or resection. *J Pediatr Surg*. 1989;24:646–648.

12. Salky B, Zimmermann M, Bauer J, et al. Splenic cyst–definitive treatment by laparoscopy. *Gastrointest Endosc*. 1985;31: 213–215.

13. Calligaris L, Bortul M. Laparoscopic treatment of a nonparasitic splenic cyst: case report. *J Laparoendosc Surg*. 1996;6:431–434.

14. Seshadri PA, Poenaru D, Park A. Laparoscopic splenic cystectomy: a case report. *J Pediatr Surg*. 1998;33:1439–1440.

15. Smith ST, Scott DJ, Burdick JS, et al. Laparoscopic marsupialization and hemisplenectomy for splenic cysts. *J Laparoendosc Adv Surg Tech A*. 2001;11:243–249.

16. Ganti AL, Sardi A, Gordon J. Laparoscopic treatment of large true cysts of the liver and the spleen is ineffective. *Am Surg*. 2002;68:1012–1017.